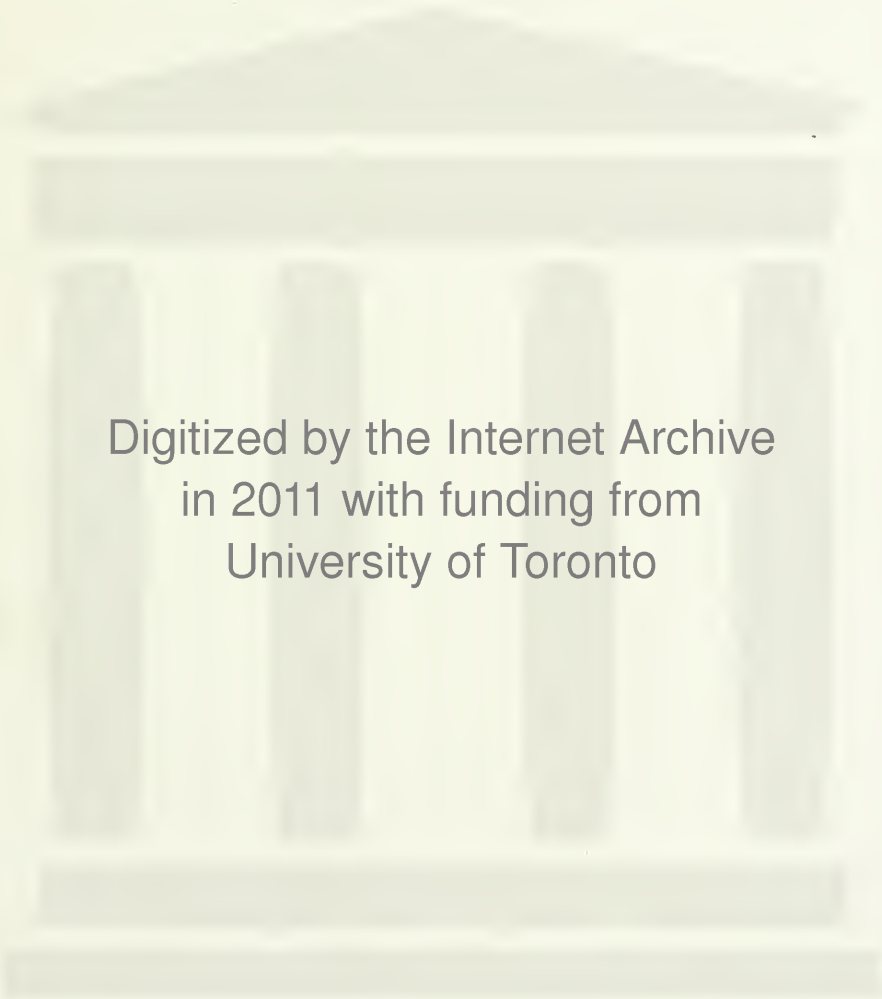
Nova Scotia Technical College

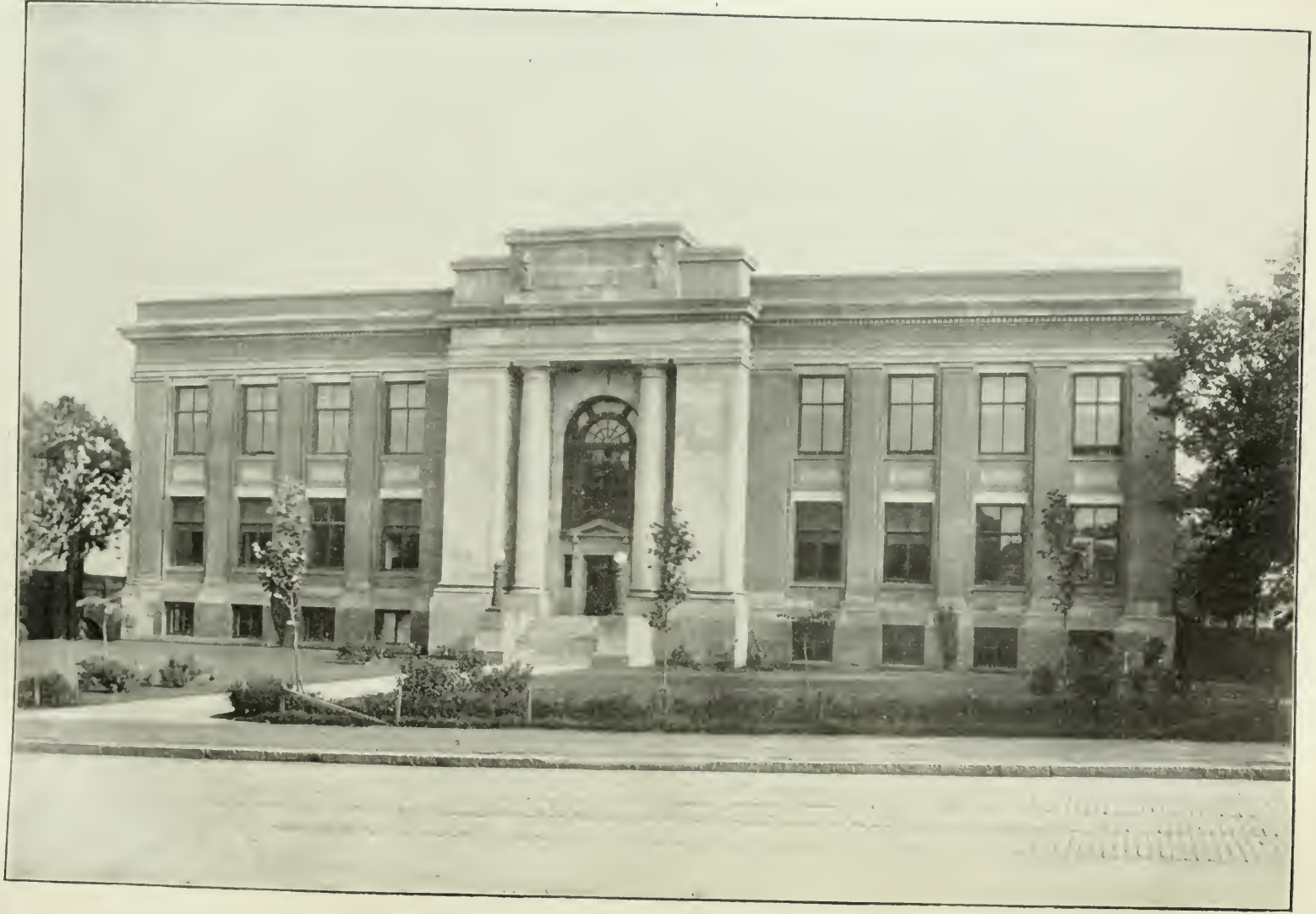
Calendar

WAR ISSUE

Halifax, N. S.

1916 1917





NOVA SCOTIA TECHNICAL COLLEGE,—Main Building.

War Issue.

Calendar of the Nova Scotia Technical College.

On account of the severe conditions imposed upon the College by the struggle between the Central Powers and the British Empire with her Allies, this special abbreviated issue of the calendar has been issued. Fuller information upon any specific points concerning the College may be secured by correspondence with the principal.

Roll of Honor.

The names of the students who are known to have enlisted for military service. The list is incomplete, but contains the information that had been gathered up to May 1, 1916.

*Boone, G. V., Sergt	4th Battery, 1st Brig. Div. Art., C. E. F.
Cavanagh, J. L., Lieut.	10th Fortress Co., C. E.
Collingwood, D. J., Lieut.	2nd Canadian Pioneer Batt., C. E. F.
Chisholm, K. G., Pte.	3rd. Univ. Corps, P.P.C.L.I., C.E.F.
Creighton, C. S., Lieut.	10th Fortress Co., C. E.
Dawson, F. M., Lieut.	40th Batt., C. E. F.
Doane, H. W. L., Lieut.	63rd Rifles, Halifax
Fowler, C. A., DeWitt, Lieut.	Unattached.
James, A. M., Sergt.	22nd Battery, 6th Howitzer Brigade, C.E.F
Jones, J. L., Bombardier	P.P.C.L.I., C.E.F.
Lumsden, J. F., Lieut.	196th Batt., C.E.F.
Major, R. A., Lieut.	55th Batt., C.E.F
Milburn, A. R., D.C.M.,Q.M.S.	6th Battery, 2nd Art. Brigade, C.E.F.
Munro, D. R. Lieut.	Unattached
Murray, R. R., Lieut.	No. 1 Tunneling Co., C.E.F.
MacCleave, A. R., Capt.	185th Batt., C.E.F.
McColough, R. W., Lieut.	10th Fortress Co., C. E.
MacCurdy, L. B., Lieut	63rd Rifles, Halifax
MacDonald, J. A., Gunner	97th Siege Howitzer Battery, C.E.F.
McGillivray, C. J., Lieut.	222nd Batt., C.E.F.
McKeen, H. S., Lieut.	10th Fortress Co., C. E.
MacKenzie, J. G. Major	25th Batt., C. E. F.
North, C. B., Capt.	Canadian Engineers, C.E.F.
Prestwood, O. E., Pte.	Mech. Trans. Div., Imperial A.S.C.
Roach, R. B., Pte.	No. 7 Stationery Hospital Unit, C.E.F.
Seaman, L. N., Adjutant	7th Siege Battery, C.E.F.
Smith, L. K., Pte.	Mech. Trans. Div., Imperial A. S. C.
Whitman, K. E., Corpl.	Fortress Intelligence Office, Halifax.

*Killed in action.

1916.

September 2, Saturday, Registration for Civil Engineering Summer Camp.
Sept. 4 to Sept. 23, Civil Engineering Summer Camp.
September 25, Monday, Registration for College Classes.
September 26, Tuesday, Beginning of Lectures.
December 23, Saturday, Beginning of Christmas Holidays.

1917.

January 3, Wednesday, Resumption of Lectures.
January 9, Tuesday, Beginning of Short Courses.
January 23, Monday Beginning of Mid-year Examinations.
February 2, Wednesday, Beginning of Second Semester.
March 7th, Saturday, Closing of Short Courses.
May 12, Thursday, Beginning of Final examinations.
May 23, Wednesday, Commencement Day.
May 24, Thursday, Beginning of Summer Vacation.
May 24, Thursday, Beginning of Summer Mining School.
June 20, Saturday, Closing of Summer Mining School.

NOTE:—Students intending to attend the Civil Engineering Summer Camp must notify the Secretary of the College on or before August 15th, 1916.

PROVINCE OF NOVA SCOTIA.

Council of Public Construction.

Hon. G. H. Murray, M. P. P., Premier and Provincial Secretary.
Hon. O. T. Daniels, M. P. P., Attorney-General.
Hon. E. H. Armstrong, M. P. P., Commissioner of Public Works and Mines.
Hon. Jason M. Mack, M. L. C.
Hon. G. E. Faulkner, M. P. P.
Hon. R. M. McGregor, M. P. P.
A. H. MacKay, LL. D., Superintendent of Education, Secretary.

NOVA SCOTIA TECHNICAL COLLEGE.

Board of Governors.

Prof. F. R. Haley, M. A., Acadia University.
Prof. J. N. Finlayson, Dalhousie University.
Prof. J. B. McCarthy, University of King's College.
Prof. J. W. Crowell, University of Mount Allison College.
Rev. H. P. McPherson, D. D., University of St. Francis Xavier College.
Rev. Bro. Culhane, St. Mary's College.
Prin. F. H. Sexton, Nova Scotia Technical College.
Prof. W. S. Ayars, Nova Scotia Technical College.
Prof. S. N. Graham, Nova Scotia Technical College.
Prof. F. R. Faulkner, Nova Scotia Technical College.

NOVA SCOTIA TECHNICAL COLLEGE.

Instructing Staff.

F. H. Sexton, S. B., Principal.
W. S. Ayars, M. E., Prof. of Electrical and Mechanical Engineering.
F. R. Faulkner, A. B., S. B., Prof. of Civil Engineering.
S. N. Graham, S. B., Prof. of Mining Engineering and Metallurgy.
G. F. Murphy, B. E., Instructor in Mining Engineering and Metallurgy.
C. A. Hodge, S. B., Instructor in Mechanical and Electrical Engineering.
G. J. Smith, S. B., Instructor in Civil Engineering.
Judge W. B. Wallace, Lecturer in Law of Contracts.
A. F. Barnes, S. B., Lecturer in Electrical Engineering.
, Lecturer in Military Science.
H. Piers, Librarian and Curator of the Museum.
L. B. Taylor, Secretary.
M. G. Doyle, Engineer.
E. H. Nauss, Stenographer.

Main Building.

The main building of the Technical College, which contains the lecture rooms, science laboratories, museum, library, gymnasium, and assembly hall, has been completed seven years. It is an imposing building of pressed red brick and freestone, erected on the military property adjoining the Court House on Spring Garden Road in Halifax. The main structure is 146 feet long, 48 feet wide, and has two wings, 41 by 52 feet long.

In the basement, room is provided for a workshop, fan room, store room, assaying laboratory, balance room, Metallography laboratory, locker room, cement laboratory, and gymnasium.

The first floor contains the administration offices, museum, curator's office, geological laboratory, lecture rooms, electrical measurements laboratory, electrical research laboratory, dark room, and heat laboratory.

On the second floor are the staff offices ,library, chemical laboratory, chemical research laboratory, lecture rooms, drafting room, and assembly hall. The building has a steel frame, reinforced concrete floors, and is of slow-burning construction throughout.

Engineering Laboratories.

The main building for the engineering laboratories was erected in 1909. This building, 40 by 160 ft., contains the central power plant, mechanical engineering laboratory, machine shop, materials testing laboratory, and hydraulic laboratory.

During the year 1911-12 the Murray Laboratory of Mining and Metallurgy was completed and the equipment partly installed. The details of the building and equipment are given in the following paragraphs:

Space has been provided for a sample grinding room, supply room, workshop, lecture room, drafting room, testing laboratory, office, and lavatory. The main portion of the building consists of one large space which is devoted to metallurgical and ore dressing processes.

The equipment for sample grinding consists of 1 Braun Chipmunk Crusher, 1 Braun Disc Pulverizer, 1 Braun Rotary Hand Grinder, 1 Allis-Chalmers Type B Sample Grinder, 1 Gates Sample Crusher, Type F. This sample grinding apparatus is driven by an independent 5 H. P., three phase, Westinghouse motor.

The equipment for metallurgy will consist of a blast furnace for smelting lead and copper ores, a hand reverberatory roasting furnace, an English cupelling furnace, a copper refining furnace, experimental cyanide plant, a pot roaster, a Bessemer convertor for copper mattes, a small coking oven, etc.

The ore dressing equipment consists of a coal washing plant as manufactured by the Jeffrey Mfg. Co., for the United States Government Coal Testing Laboratory, 1-7″ x 10″ Blake Rock Breaker, 1 Type O D Gates Gyratory Breaker, 1-5′ Huntington Mill, 1 set 10″ x 12″ laboratory crushing rolls, 1-6″ vertical mill elevator 1 set standard trommels, 1-2 compartment laboratory Hartz jig, 1-Richards Pulsator jig, hydraulic cone classifiers, 1 half-size Wilfley concentrating table, 1-Standard 4′ Frue suspended vanner, 1 James Slime Table, 1-five stamp mill with 450 lbs. stamps and Hendy Challenge Feeder, 1 Frenier Sand Pump, 1 magnetic separator, 1 Abbe′ Ball Mill.

There is installed in the building a model mine plant with a 30 H. P. upright tubular boiler, 1-10″x10″

x 10″ Ingersoll straight line compressor, 1-5″ x 6″ Lidgerwood friction hoist with 10′ drum. It is planned to make every student in Mining Engineering thoroughly familiar with these fundamental machines before graduation.

Apparatus for the testing of materials for highway construction is also installed in the Mining and Metallurgical Laboratory. This consists of 1 De Val abrasion cylinder, 1 ball mill, 1 Olson standard impact testing machine, 1 Olson Page cementation briquette former, and 1 Olsen Diamond saw.

In this Mining and Metallurgical Laboratory industrial research on the mineral resources of the provinces is carried on as well as the instruction of college students in Mining Engineering.

College Government.

The Governing functions of the Nova Scotia Technical College are vested in a Board of Governors and the Council of Public Instruction. The Board of Governors consists of one member nominated by each of the five affiliated Colleges and universities in the Maritime Provinces, together with the professors of the teaching staff of the Technical College.

This Board makes all regulations in regard to admission requirements, general curriculum, and other matters which concern the general standard and welfare of the College. The Board of Governors is under the supervision and control of the Council of Public Instruction, and all regulations made by the former body must receive the ratification of the latter.

Affiliation.

The Nova Scotia Technical College is affiliated with the following universities,—Acadia, Dalhousie, King's, Mount Allison, St. Francis Xavier and St. Mary's. By the terms of the affiliation, the separate universities offer a uniform course in engineering covering the first two years, and the Technical College offers professional courses in several departments of engineering covering the last two years course. Students from the separate universities are admitted to the Technical College on certificate without examination under certain conditions enumerated later. The matriculation requirements for entrance into the uniform engineering course of the separate colleges are also uniform and are set forth in the succeeding paragraph.

Admission to the First Two Years Engineering Course in the Affiliated Universities.

Applicants for admission must have attained the age of 16 years.

The following is an outline of the subjects and the standard or grade in each subject which is required for admission as a regular engineering student:

1. *Arithmetic and Algebra*:

   Arithmetic.
   Algebra, as in Grade XII, or equivalent.

2. *Geometry and Trigonometry*:

   Geometry as in Grade XII, or equivalent.
   Trigonometry: Plane Trigonometry, as in Grade XII, or equivalent.

3. *English*:

   As in Grade XII, or equivalent.

4. *French or German*:

   As in Grade XI, or equivalent.

5. *History*:

   As in Grade XI, or English and Canadian History.

6. One of the following:
   (a) *Latin*, as in Grade XI, or equivalent.
   (b) *Greek*, as in Grade XI, or equivalent
   (c) Additional work, equivalent to that required for Grade XII, in the language chosen in Subject 4.

Regulation for Students Conditioned in Matriculation.

"No student shall be admitted to the full work of the first year of the engineering course who is deficient in mathametics, or more than one other matriculation subject. Any student who has more conditions than outlined above may enter College and take a combined Arts and Engineering Course, provided that he can satisfy the matriculation requirements of that college. Such a person can not be considered a regular first year student in engineering, and will require three years of work to complete the first two years of the engineering course. All matriculation requirements must be removed before the student can enter the second year of the engineering course."

In plain language this means that a sharp distinction shall be drawn between the regular student who has passed all matriculation requirements, and a student who has not obtained the required standard. Any student who fails in matriculation examinations in Mathematics, or in more than one subject, will have to take another year in the Academy and pass the Grade XII examinations, or else he may enter College as a conditioned student, and take up in the first year Arts Course the subjects in which he was conditioned

It is better for the average student to spread the first two years engineering course over a period of three years, so that he may be better grounded before entering the Technical College and it is earnestly recommended that students should pursue this course.

Admission to the Technical College.

Applicants must have attained the age of eighteen years.

The students who enter the Technical College will be classified as *regular* or *special*. Regular students are those who are full candidates for degrees, and special students are those who voluntarily, or by reason of not having passed all requirements up to the time of classification, are taking special courses.

Admission to the Technical College will be on certificate from the properly authorized officer of the university at which the student has pursued his first two years engineering course. The certificates must state the subjects taken, the marks made in each subject, and the pass mark required at that university in engineering courses. Certificate blanks will be furnished on application to the Principal of the Technical College.

Regular students will be admitted to the Technical College who have secured the required proficiency in *all the courses* of the first two years Engineering Course as hereafter outlined.

Special students will not be permitted to take more than three courses simultaneously if they wish their work to count toward a degree.

Note—The following temporary exception has been adopted:

Regular students will be permitted to enter the Technical College who are *conditioned in one subject only* of the first two years course, provided that that subject is not one of the following:

Mathematics, Physics, Chemistry, Surveying or Drawing.

The right, however, is reserved to exclude as a regular student anyone who has failed in any other subject of the preliminary course than those specified above.

Admission to Advanced Standing in the Technical College.

Any person may be admitted to advanced standing in the Technical College by passing such examinations as are deemed necessary by the College faculty, or by submitting such certificates of previous records of study or experience as shall satisfy the faculty. All applications for special examinations for advanced standing must be made to the principal of the college betore September 1st, 1916.

Any person on the payment of the required fee and the production of evidence to the faculty of sufficient knowledge and training to benefit by the instruction in

any separate class or classes given in the Technical College, may enter and pursue such class or classes as a special student.

Degrees.

To whomsoever shall satisfactorily acquire the requisite proficiency in all the regular courses of either Civil, Mining, Mechanical, or Electrical Engineering as prescribed in this calendar shall be given by the Technical College a degree of Bachelor of Science in that department in which he has pursued his studies.

Certificates.

Anyone attending one or more classes in the Technical College and attaining the requisite standard of proficiency in said class or classes shall, on application, receive a certificate attesting to the exact work done.

Tuition Fees, Deposits, Etc.

The tuition for instruction in any regular department of engineering shall be seventy-five dollars ($75) per year, forty dollars of which shall be paid within one month from the opening in September and the remainder during the first month of the second term, which begins usually in February.

To those who are attending special classes the fees are as follows:—

For any single class for one-half year	$ 7.50
" any single class for one whole year, or for two classes for one-half year	12.00

For	three classes for one-half year	18.00
"	four " "	23.00
"	five " "	28.00
"	six " "	33.00
"	seven " "	38.00
"	eight or more classes for one-half year	40.00
"	seven or more classes for whole year	75.00
	Short Courses, each	15.00

An advance deposit of $5.00 will be required of all students taking laboratory classes on entrance to the same to cover breakage or damage to apparatus. An itemized account of supplies or damages will be rendered at the end of year for settlement.

Scholarships.

Engineering Courses.

There is one free scholarship of a value of seventy-five dollars ($75.00) for each of the eighteen counties of Nova Scotia, except the counties of Halifax and Cape Breton, for which there are two free scholarships each. These scholarships are to be awarded on the basis of need and merit after the results of the mid-year examinations. The applicants for scholarships must have been *bona fide* residents for more than three years in the county for the scholarships for which they are seeking. If there is no applicant in any one year for a certain scholarship, a student, resident in any other county for more than three years previously may by permission of the Faculty apply for the vacant scholarship and may be awarded the same by the Faculty.

Short Courses.

There are offered seven scholarships of seventy-five dollars each ($75.00) for students in the short courses.

Mr. E. M. Macdonald, M. P. of Pictou offers each year two scholarships of $75.00 each, one for a student who is a son of a coal miner in Pictou County and another for a student who is the son of a steel-worker in Pictou County. The scholarships are awarded to the young men who make the best marks in a competitive examination in arithmetic and English based on the work of Grade VIII in the common schools. The examination is held within a few days of Christmas in the High School at New Glasgow.

Mr. George E. McDonald, formerly of Truro, N. S., and now of Vancouver, B. C., offers two scholarships of $75.00 each, one for the son of a railroad employee in Pictou County, and the other for a son of a railroad employee in Colchester Co. The scholarships are awarded to the young men who make the highest marks in a competitive examination, the nature of which has been mentioned in the preceding paragraph. Examinations are held in Truro and New Glasgow within a few days of Christmas each year.

Hon. Senator Dennis of Halifax, N. S., offers three scholarships of $75.00 each to those students in the short courses each year who deserve the honor on the basis of need and merit.

First Two Years Uniform Engineering Course in the Affiliated Universities.

Acadia, Dalhousie, King's, and St. Francis Xavier have amended the two years' uniform engineering course in their respective universities. Following is

the outline of the amended courses as they will be carried out after September, 1911, in the above colleges:

I. **Mathematics**—

1. Solid Geometry..... 24 hours.
2. Analytical Geometry..... 48 hours.
3. Calculus: Differential and Integral 96 hours.

II. **Chemistry**—

1. Gen. Chemistry: Lectures..... 72 hours.
2. Gen. Chemistry: Laboratory..... 96 hours.
3. Qualitative Analysis: Lectures.... 24 hours.
4. Qualitative Analysis: Laboratory.. 96 hours.

III. **English**—

1. English Composition..... 48 hours.

IV. **Drawing**—

Freehand: ,Mechanical and Machine Drawing.....240 hours.

V. **Physics**—(Including Mechanics, Electricity, Heat, Light, and Sound.)

1. Lectures and Recitations.....120 hours.
2. Laboratory .....120 hours.

VI. **Surveying**—

1. Lectures ..... 48 hours.
2. Field work, Mapping, and Topographical Drawing.....144 hours.

VII. **Descriptive Geometry**—

Lectures, Recitations and Drawing.... 72 hours.

VIII. **General Geology**—

Lectures ..... 48 hours.
Laboratory and Field Work..... 72 hours.

IX. **Kinematics**—

Kinematics of Machines..... 72 hours.

X. **Workshop** .....216 hours.

Prerequisites.

Students who are entering the Technical College and are deficient in any of the required entrance subjects will not be allowed to take any course for which that subject is a prerequisite.

Any student who wishes to take a special course in the Technical College must have previously passed the course which will enable him to benefit by the advanced instruction. The prerequisites for the regular courses are given in the following table:—

Mechanics of Engineering	Mathematics and Physics.
Railway Location	Trigonometry and Surveying.
Thermodynamics	Mathematics and Physics.
Advanced Surveying	Trigonometry and Surveying.
Roads and Pavements	Surveying and Trigonometry.
Machine Design	Drawing and Kinematics of Machines.

Electrical Machinery	Physics
Electrical Laboratory	Physics.
Applied Geology	Geology.
Quantitative Analysis	Chemistry.
Principles of Metallurgy	Chemistry.
Mine Surveying	Surveying.
Mechanical Engineering Laboratory	Kinematics of Machines.
Assaying	Chemistry.
Mineralogy	Chemistry and Geology.

If a student, however, wishes to study some special course and does not wish to count this towards a degree, he may be allowed to take such course at the discretion of the Faculty of the Technical College upon his presenting a signed statement that he does not wish the work to count towards a degree.

Engineering Camp.

A united engineering camp for students between the second and third and the third and fourth years, will be held in some place to be selected in Nova Scotia, September 4th to September 23rd, 1916. There will be required a deposit of eighteen dollars ($18) for this class.

Short Courses.

The Technical College offers special short courses each year during the months of January and February. These courses are planned for the needs of men in industries who have not had the opportunity to take a full engineering course, but who desire special technical instruction in order to advance in their vocations.

Short courses are given in the following subjects:—

Land Surveying.
Steam Engineering.
Machine Design.
Architectural Drafting.
Structural Steel Drafting.
Electrical Machinery.
Coal Mining Engineering.
Metallurgy of Steel.
Technical Chemical Analysis.
Assaying.

A special pamphlet with a full description of the courses will be sent upon application.

School of Navigation.

The Federal Department of Marine and Fisheries co-operates with the Technical College in maintaining a School of Navigation for seamen. The courses of study are adapted for those who wish to obtain government certificates of competency on vessels in inland waters and minor waters, coasting vessels, and deep sea vessels in the mercantile marine. Instruction is given to enable the man with the requisite amount of service to secure a certificate of master for transatlantic liners. The school is open every day except Sunday and every week-day evening except Saturday all the year round. Tuition is free and each person receives individual instruction. Further particulars are set out in a special pamphlet which will be sent on request.

Testing Machines.—One hundred thousand pound capacity testing machine, extensometer for tension and compression, improved deflection instrument, improved dial deformeter, Gilmour needle, Briquette Moulds, Le Chatelier specific gravity apparatus, Olsen's compres-

sion micrometer, encased abrasion cylinder, 2,000 lb. traction dynamometer, 50,000 lbs. hydraulic compression testing machine, traverse tester of 10,000 lb. capacity, 60,000 inch-pound torsion testing machine.

EQUIPMENT.

A great deal of time and thought has been spent on the equipment for the various laboratories to select a good, thorough, up-to-date assembly of apparatus for teaching purposes. The apparatus as far as it has been purchased already, is given below.

Civil Engineering.

Surveying Instruments.—Queen Transit, 2 Gurley transits, 1 Buff and Buff transit, 1 Keuffel and Esser mining transit, 1 Buff and Buff triangulation theodolite, 1 Buff and Buff Wye level, 2 Gurley levels, 1 Buff and Buff Dumpy level, 1 Stanley level, 1 Keuffel and Esser level.

Electrical Engineering.

A great deal of the apparatus of the Electrical Department is used jointly with the Mechanical Engineering Department. The larger units are in the Engineering Laboratories building and the others in the main building in the Dynamo Laboratory, in the Electrical Measurements Laboratory, in the Dark Room, and in the Battery Room.

The main power-unit is a 50 K. W. 3-wire D. C. generator, 220-110 volts, direct connected to a Robb automatic cut-off 10″x12″ high-speed engine. This set is wired up so as to supply direct current to the laboratories, and for light and power in all the buildings. In addition, there are connections to the Halifax

Electric Tramway Companies lines through two transformers; one supplying 220-volt 3-phase 60-cycle current for power, and the other 3 wire, 220-volt 60-cycle current for lighting the buildings. In the Dynamo Laboratory is a generator set consisting of a Can. Westinghouse Co. 3-phase induction motor directly connected to a D. C. Generator 110 volts, 42 amperes of same make, supplying 110 volts. This set is connected to the permanent wiring of the building for supplying D. C. when the need is not sufficient to demand running the main unit. Its energy is drawn from the Halifax Tram Company's mains, 220 volts, 3-phase.

In the Engineering Laboratory are also located the hand and power tools comprising the machine-shop equipment. Power for the shop is supplied by a motor belted to a line shaft. The college shops are not intended as part of the teaching equipment directly but are used principally for the repair and manufacture of apparatus and equipment. In addition to the machine shop drive, other electrical machines in the Engineering Laboratory are two 5 H. P. motors direct connected to turbine and centrifugal pumps, and another of the same size belted to a small air-compressor. There is also a Canadian General Electric Co. Edison bipolar generator 125 V., 25 K. W. which can be belted to any one of several engines and used as a load or tested as a generator or motor. Other motors in this building are used to drive various testing machines; all are for 220 volts D. C., taking power from the outside wires of the main generating set. This building also contains the main switchboard with a complete equipment of indicating and recording instruments, leakage indicator, circuitbreakers, and switches.

In the Dynamo Laboratory are a Fairbanks motor-generator set, compound wound, consisting of two similar 220-volt D C. 5. H. P. dynamos either of which can be run as a motor driving the other as a generator; the Westinghouse A. C.–D. C. motor-generator set before mentioned; one special laboratory rotary convertor with six slip-rings, capable of a great variety of experimental work; two Canadian General Electric 5 H. P. 3-phase A. C. dynamos with extra rotors, also capable of operation in various ways as motors or generators; 2 shunt and 2 series C. G. E. motors, 5. H. P. 110 volts, which can be run on brake-load, belted to other machines, or direct connected, as desired. There are also a Can. Westinghouse 5. H. P. single-phase A. C. motor, a C. G. E. single phase repulsion motor of about the same power; a Lincoln variable-speed D. C. motor with a wide range; and a number of small motors and generators, A. C. and D. C. single- phase and three-phase.

Nearly all the above machines are mounted on heavy tables with steel frame-work supports, bringing them to a convenient height for observation, examination or adjustment; and while most of them are large enough so that the parts are on a good, sturdy, visible scale, it is nevertheless not difficult to move them about from place to place, and to make new connections, mechanical or electrical, for various experiments. The motors can be loaded by brake, by direct connection, or by belting; and the generators by lamp-bank, direct or belt connection, or water rheostat. There are three lamp banks; one of 250 volt 16 c. p. carbon incandescent lamps; one of 125-volt 32 c. p. lamps, and one of 125-volt 16 c. p. lamps. Each contains about 190 lamps with switches for throwing in any desired number or combination.

The Dynamo Laboratory also contains the cases where the usual measuring instruments are kept. This equipment is exceptionally complete, comprising a wide range of voltmeters, ammeters, and watt meters, principally of the Weston make, for direct and alternating current, including a number of shunts, multipliers, series and potential transformers, etc. There are four Starrett and two Schaeffer and Budenburg speed indicators; several mechanical tachometers, one Weston electric tachometer and one Hopkins electric speedometer. There is also an ample assortment of slide-wire manganin rheostats, and standard field resistence rheostats; and each motor of any size is provided with suitable starting resistance or compensator. This Laboratory also contains a special laboratory switch board in two panels. It is provided with 3 Weston D. C. switchboard Ammeters and 2 Weston voltmeters, with three integrating wattmeters. The front terminals are in the form of sockets, and flexible cables with end plugs are used, thus making almost any combination of connections possible. There is also a number of circuit-breakers, switches and fuses, and the charging and discharging connections and switches for the storage battery. Adjoining the switchboard is a ten ampere C. G. E. mercury arc rectifier; and in this room are kept a number of standard and special transformers, in size from 75 K. W. down, some being provided with a great number of taps, and mounted in portable stands with terminal boards for plug connection.

In the Electrical Measurements Laboratory are kept the more delicate laboratory standard and precision instruments. These include a number of fine instruments of Siemens-Halske make, a Weston laboratory-standard millivoltmeter with shunts and multipliers, bridges of various makes, Leeds and Northup potentiometer, electric pyrometers, galvanometers, standard resistances and all other essential instruments

for close and accurate work. In this room are located a powerful spark coil with electrolytic interrupter and controlling resistance by Siemens-Halske, and used for X-ray and similar experiments, and a large number of parts of standard electrical machines for illustrative purposes; also a fine G. E. oscillograph for both visual and photographic work.

In the basement is the battery-room, with a 60-cell Westinghouse storage battery, end cell regulation, and a number of other batteries, primary and secondary; and between the Dynamo and Electrical Measurements Laboratories is the dark room with a 72″ cylindrical electrical blue-print machine made by Keuffel & Esser with Adams-Bagnall 15 amp. enclosed A. C. arc lamp and regulating compensator, and a large Elliot photometer. The laboratories also contain samples of all the more common electrical appliances in general use, such as wiring fixtures, sockets, conduits, switches, different sorts of insulated wire and cable, various types of arc and incandescent lamps, telephones, telegraph, instruments, dry and wet batteries, scales and balances, micrometers, machinists' and electricians' tools, fuses, and spare and repair parts for many of the machines and appliances. None of the apparatus is cheap or unreliable, and students are free to use any of the equipment under proper direction and care when they are sufficiently advanced to understand how to handle it intelligently. No voltage higher than 220 is obtainable without special connections, so there is practically no danger to any student working in the laboratories, unless he deliberately tries to hurt himself.

Mechanical Engineering.

The main units in the mechanical laboratory are located in the Engineering Laboratories building. Polwer is derived from two horizontal return tubular

boilers of 80 H. P. each, which in addition supply heat to all the buildings. These are hand-fired, natural draft, and may be fed by either injectors or feed pump. They are supplied with the usual accessories for testing. The return from the heating system are fed back automatically into the boilers by the Bundy double-acting trap systems; there is also a Cochrane open-heater used with the feed pump for feeding hot water when any of the steam-units are running. These latter are as follows:—

One horizontal cross-compound non-releasing Robb Corliss automatic cut-off engine with cylinders 12″ x 20″ stroke, having especially wide range of adjustment of governor and valve gear, and built by the International Engineering Works of Amherst, N. S. (Formerly Robb Engineering Co.) This engine is designed for a normal load of 150 H. P. non-condensing to about 220 H. P. condensing, at 180 R. P. M. There are two pulleys for taking off power by belt, and the L. P. Side has the shaft extended through an out-board bearing carrying a flange-coupling for direct-connection to dynamometer or other load. In addition the main pully, which serves also as a flywheel is equipped with a water-cooled brake as made by the Westinghouse Machine Co, of ample capacity to absorb the full power of the engine. This is a direct 8″ exhaust to the atmosphere, and a 9″ exhaust to surface condenser, also a 4″ connection to the heater.

One automatic high-speed engine, Robb make, 75 H. P. 10″ x 12″ direct connected to 3-wire generator as given under Electrical Engineering. This engine can exhaust to condenser, to atmosphere or to heater, and, like the large engine, is fully equipped for testing.

One 10 H. P. horizontal engine by James Leffel Co., balanced slide valve, medium speed, equipped for valve setting, testing, etc.

One vertical 8 H. P. engine by I. Matheson & Co., equipped for testing.

One Kerr Steam Turbine, 20 B. H. P. at 3600 R. P. M.

One de Laval turbine, 20,000 R. P. M., gear connected to Sturtevant high-speed blower.

One Worthington surface-condenser, three-pass, 350 sq. ft. of cooling surface, mounted on stanchions over independent steam-driven vacuum pump. In addition, there is a Sims heater, 87 sq. ft. of tubes so mounted that it may be used as a surface condensor at atmospheric pressure. This heater can be used as a condenser for any of the smaller units when the evaporation under atmospheric exhaust conditions is to be measured.

In addition to the boiler feed pump and the vacuum pump belonging to the surface condenser, there are—one McDougall duplex steam pump 10″ x 6″ x 10″, one Blake duplex pump, two centrifugal and one turbine pump, motor-driven. By means of open and pressure tanks at different levels, these pumps may be driven under varying conditions of lift and pressure.

Other sources of motive power are: one Crossley Oil Engine of 4 H. P., hot tube ignition, which may be run with various fuels; one Fairbanks-Morse 4 H. P. horizontal gas or gasolene engine; one "Gray Motor," vertical 2 cycle engine, 12 H. P. at 600 R. P. M. (This engine can be run on gasolene or kerosene by proper

changes in the carburetor; one 4-cylinder Ford automobile motor, and the other parts of the Ford chassis and transmission gear.

For heat measurements there are: one Boys' standard gas calorimeter with pressure regulator and meter; Parr calorimeters for calorific value of coal; total carbon apparatus for proximate coal analysis; Ellison's throttling-evaporating calorimeter for obtaining dryness of steam; Carpenter's separating calorimeter; barrel calorimeter; calorimeter for tests or saturated steam, apparatus for determining heat radiation from lagged and bare pipes; small air-compressor with orifice box for determination of flow of air; Hay's flue-gas analysis apparatus complete with gas sampler. For general mechanical laboratory tests; one Crosby gauge tester; one Engler viscosimeter; one Venturi meter complete as made by builders' Iron Foundry of Provi- Providence, R. I.; one Pelton wheel; one weir fitted for experimental work; one hydraulic ram, with various heads; two large pressure tanks used in connection with various tests in hydraulics and calibration of orifices.

In addition, there is a full equipment of such smaller apparatus as steam and gas engine indicators, planimeters, brakes, weighing apparatus, thermometers speed counters, and other instruments used jointly with the Department of Electrical Engineering.

Mining Engineering.

See pp. 43 *et seq.*

SYLLABUS OF ENGINEERING COURSES:

Department of Electrical Engineering.

As announced elsewhere, the first two years of this course are given in the affiliated colleges. The course as herein described covers the third and fourth

years. The plan is to give a broad and thorough training in the theory and practice of applied electricity, together with that portion of its closely allied subject, steam and machine design. Greater stress is laid on thorough knowledge of the more elementary subjects than on the advanced theoretical side of the subject, but as much of the latter is included as can be given in the time available.

The laboratories are exceptionally well supplied with engineering instruments suited to the work to be done throughout the course. It is to be noted further that these instruments are all accurate, high-grade, and reliable, the product of the best makers in America and Europe. They are intended for thoughtful and intelligent use and due care must be used at all times in handling them. Students are held strictly accountable for injury resulting from rough or careless manipulation and are not entrusted with the finer apparatus, until they have shown proper skill and pains in manipulation and adjusting. The laboratories are located in the main building and in the engineering laboratories building, and are fully described, pp 19-23.

Students taking this course should have a sound working knowledge of mathematics, physics, elementary chemistry, and mechanics. The theoretical work runs parallel with the laboratory work, extending thru the third and fourth years. The laboratory work is carried on with the purpose of developing quick and keen observations, the ability to observe and interpret data logically, quick and skilful manipulation of instruments, manual dexterity ,and the careful and intelligent handling of expensive and easily-injured machines. Neatly and legibly written reports are required accompanied by sketches, log-sheets, and performance curves when needed, and the use of good English is insisted upon.

201-202. Electrical Machinery.

Third Year, First and Second Semester, Three Hours per Week.

Text—W. H. Timbie.—"Elements of Electricity."

201A-202A—Electrical Machinery.

An abbreviation of 201-202 *for students in Civil and Mining Courses. Two hours per week. Third year.*

203-204 Alternating Currents and Machinery.

Fourth Year, First and Second Semesters, Three Hours per Week.

Text—Franklin and Esty:—Elementary Electrical Engineering-Alternating Currents.

208—Electrical Engineering Abstracts.

Fourth Year, Second Semester, One Hour per Week.

209—Electrical Distribution.

Fourth Year, Second Semester, Three Hours per Week.

Text—Weingreen:—"Electric Power-Plant Engineering."

211—Electric Railways.

Fourth Year, Second Semester, Fifteen Weeks, Two Hours per Week.

212—Electric Design.

Fourth Year, Second Semester; One Three Hours Period per Week.

250-251—Electrical Engineering Laboratory.

Third Year, First and Second Semester, One Three Hour Period per Week.

References.

W. H. Timbie:—"Electrical Measurements in Direct and Alternating Current,"
V. Karapetoff:—"Elementary Electrical Testing."
C. F. Smith:—"Testing of Dynamos and Motors."
Franklin & Esty:—"Dynamo Laboratory Manual."

252-253—Electrical Engineering Laboratory.

Fourth Year, First and Second Semesters, One Three Hour Period per Week.

References.

C. F. Smith:—"Alternating Currents."
Karapetoff:—"Experimental Electrical Engineering."

(See also under 250-251.)

215—Storage Battery Engineering.

Fourth Year, First Semester, Two Hours per Week.

Text—Lyndon:—"Storage Battery Engineering."

270—Contracts and Specifications.

Fourth Year, All Courses, Second Semester, One Hour per Week.

301—Steam Engines, Turbines, and Boilers.

Third Year, All Courses, First Semester, Four Hours per Week.

302—Thermodynamics.

Third Year, Second Semester, Four Hours per Week.

303—Steam Power Plants.

Fourth Year, First Semester, Three Hours per Week.

350-351—Mechanical Engineering Laboratory.

Third Year, First and Second Semesters, Fifteen Weeks;

One Lecture and One 3-Hour Laboratory Period per Week.

352-353.—Mechanical Engineering Laboratory.

Fourth Year, First and Second Semesters; one Lecture and one 3-Hour Laboratory Period per Week.

329-330.—Machine Design Theory.

Third Year, First Semester, Three Hours, and Second Semester, Two Hours per Week.

330A—Machine Design Theory.

Fourth Year, First Semester, Two Hours per Week.

331-332—Machine Design and Drawing.

Third Year, First and Second Semesters, Two 3-Hour Periods per Week.

333-334—Machine Design and Drawing.

Fourth Year, First and Second Semesters, Fifteen Weeks, Two 3-Hour Periods per Week.

333A—Machine Design and Drawing.

Fourth Year, First Semester, One 3-Hour Period per Week

101—Mechanics of Engineering 1.

Third Year, First Semester, Fifteen Weeks, Five Hours. per Week.

102—Mechanics of Engineering II.

Third Year, Second Semester, First Nine Weeks, Five Hours per Week.

103—Materials Testing.

Third Year, Second Semester, One 3-Hour Laboratory. Period per Week.

105—Structures I.

Third Year, Second Semester, Last Six Weeks. Five Hours per Week.

111—Theoretical Hydraulics.

Fourth Year, First Semester, Three Hours per Week.

112—Hydraulic Testing.

Fourth Year, First Semester, Three Hours per Week.

153—Hydraulic Engineering.

Fourth Year, Second Semester, Three Hours per Week.

600—Technical Writing.

DEPARTMENT OF MECHANICAL ENGINEERING.

This is a four years' course, the third and fourth of which are given in the Technical College, as outlined in the following schedule. It is designed to convey a thorough knowledge of the basic principles of the design construction, manufacture, and operation of machinery as used in manufacturing industries, power plants, and power transmission, as well as a general idea of the problems to be encountered in the executive and business management of the industries common to all modern civilization. Students who take this course should not only have a thorough elementary training in mathematics, physics, and shopwork, but should have in addition a natural aptitude for machinery, engines, power and hand tools; and no dislike to long hours, hard physical and mental work, and the frequent wearing of overalls. Any men who can enter this course, after several years actual experience in machine-shop or power-plant will be all the better fitted for it and for such men there are more openings today than the colleges can supply.

All mechanical Engineers require a good general knowledge of applied electricity, and all electrical engineers require thorough training in mechanical principles. Therefore the two courses are similar through-

out and identical in the third year. In the fourth year the student drops the more advanced electrical work and goes deeper into the study of the design and performance of machinery, steam and gas engines, and turbines. The mechanical laboratories are designed and equipped to give the student the necessary practice in the handling and testing of machinery in general, and of motive power units particularly. The equipment is complete and modern, and well adapted to illustrate the principles of the course as given in the class-room.

It is not intended to make an expert draughtsman out of every student taking this course; nevertheless, a great deal of work must be done on the drawing-board, as it is today absolutely essential that all work shall be completely planned before undertaking any construction. Hence the course includes not only sketching and drawing of machines and their details, but a great deal of graphical and diagrammatic work, rational and empirical designs, and considerable applied kinematics. Those men who enter with a defective knowledge of kinematics will be given a thorough review of the subject, as it is most essential to all engineering work involving valve-gears, cams, linkages, governors, etc.

301—Steam Engines, Turbines, and Boilers.

Third Year, First Semesters. Fifteen Weeks, Four Hours per Week.

Texts—Selected Papers from the I. C. S. Course in Steam Engineering. "Steam Boilers" E. M. Shealy.

302—Thermodynamics.

Third Year, Second Semester, Four Hours per Week

303—Steam Power Plants.

Fourth Year, First Semester, Three Hours per Week.

Texts—Meyer:—"Steam Power Plants."
Crane Co.:—"Catalogue No. 40."

305—Steam Turbines.

Fourth Year, Second Semester, Two Hours per Week.

Text—Stodola:—"The Steam Turbine."

306.—Gas Engines.

Fourth Year, Second Semester, Three Hours per Week.

307—Mechanical Engineering Abstracts.

Fourth Year, First Semester, One Hour per Week.

350-351.—Mechanical Engineering Laboratory.

Third year, First and Second Semesters, One 3-Hour Period per Week.

Reference— Carpenter:—"Mechanical Engineering Laboratory."

351—Mechanical Engineering Laboratory.

Fourth Year, First and Second Semesters, One 3-Hour Period per Week.
References:—

Carpenter:—"Experimental Engineering."
Flather:—"Dynamometers and the Measurement of power."

322—Heating and Ventilating.

Fourth Year, First Semester, Three Hours per Week.

Text—Carpenter:—"Heating and Ventilating."

329-330—"Machine Design Theory."

Third Year, First Semester, Three Hours, and Second Semester, Two Hours per Week.
Texts.

Spooner:—"Machine Design, Construction and Drawing."

Kent:—"Mechanical Engineer's Pocketbook."

330A—Machine Design Theory.

Fourth Year, First Semester, Two Hours per Week.

331-332.—Machine Design and Drawing.

Third Year, First and Second Semesters, Two 3 Hour Periods per Week.

333—Machine Design and Drawing.

Fourth Year, First Semester, Two 3 Hour Periods per Week.

333A—Machine Design and Drawing.

Fourth Year, First Semester, One 3 Hour Period per Week.

334—Machine Design and Drawing.

Fourth Year, Second Semester, Two 3 Hour Periods per Week.

336—Mechanical Design.

Fourth Year, Second Semester, One 3 Hour Period per Week.

201-202—Electrical Machinery.

208—Electrical Engineering Abstracts.

209—Electrical Distribution.

250-251—Engineering Laboratory.

270—Contracts and Specifications.

101—Mechanics of Engineering I.

102—Mechanics of Engineering II.

103—Materials Testing.

105—Structures I.

111—Theoretical Hydraulics.

112—Hydraulic Laboratory.

153—Hydraulic Engineering.

428—Metallurgy of Iron and Steel.

600—Technical Writing.

DEPARTMENT OF CIVIL ENGINEERING.

The course in Civil Engineering covers two years of prescribed studies, designed to provide a thorough foundation in the fundamental principles involved in all engineering practice. Students entering this course should be well prepared in physics, mathematics, (including calculus) elementary surveying and in mechanical drawing and descriptive geometry.

Instruction is given by means of lectures and recitations and by practice in the laboratory, the drawing room, and the field. It is the aim to cover thoroughly the subjects taught, rather than take up in a superficial manner the whole field of civil engineering subjects. Problems are made as practical as possible, and the student is encouraged to depend upon himself in their solution rather than to follow rule-of-thumb methods.

101—Mechanics of Engineering I.

Third Year, First Semester, Fifteen Weeks, Five Hours per Week.

Text—Wright:—"Elements of Mechanics."

102—Mechanics of Engineering II.

Third Year, First Nine Weeks of the Second Semester, Five Hours per Week.

Text—Boyd:—"Strength of Materials."

103—Materials Testing.

Third Year, Second Semester, Fifteen Weeks, One 3 Hour Laboratory Period per Week.

105—Structures I.

Third Year, Last Six Weeks of the Second Semester, Five Hours per Week.

Text—Spofford:—"Theory of Structures."

111—Theoretical Hydraulics.

Fourth Year, First Semester, Fifteen Weeks, Three Hours per Week.

This is a course of 45 exercises in the first semester of the fourth year and deals with the theory of water pressure and the flow of water through orifices, tubes, pipes, canals and rivers, discharge over weirs, and losses due to friction and other causes.

Text—Russel:—"Hydraulics."

112—Hydraulic Laboratory.

Fourth Year, First Semester, Fifteen Weeks, Three Hours per Week.

This course runs concurrently with No. 111 and includes a series of experiments for determining the discharge of orifices, nozzles and weirs under varying conditions, and a determination of the coefficients involved determination of losses in pipes due to friction and other causes, measurement with the Venturi meter; efficiency tests on the ram, turbine, Pelton wheel, etc.

Students make written reports involving computations, plotted curves, etc., based upon the data collected.

119—Advanced Surveying.

Third Year, First Semester, Fifteen Weeks, Four Hours. per Week.

Lectures, field, and drafting room work covering the following: the use of stadia and plane table in topographic work; precise, barometric and trigonometric levelling. The mapping of surveys made at the previous summer camp will be completed.

120—Advanced Surveying.

Third Year, Second Semester, Fifteen Weeks, Five Hours per Week.

The principles of practical astronomy and the determination of latitude, longitude, azimuth, and time with ordinary surveying instruments, Photographic surveying. The relation of geology to topography. Hydrographic surveying and stream gaging.

The drafting room will include a problem in the paper location of a line of railroad.

Text—Breed and Hosmer:—"The Principles and Practice of Surveying," Vol. II.

121—Railroad Engineering I.

Third Year, Second Semester, Fifteen Weeks, Four Hours per Week.

This course comprises a study of the mathematics of curves as used in railroad work, the easement curve, methods of staking out and computating earth work.

Numerous problems for outside solution are given, and the practical application of problems studied is constantly emphasized.

Text—Allen:—"Railroad Curves and Earthwork."

122—Railroad Engineering II.

Third Year, Second Semester, Fifteen Weeks, Three Hours per Week.

Text—Raymond—"Railroad Engineering," Vol. II.

123—Summer School of Surveying.

124—Railroad Design.

Fourth Year, First Semester, Fifteen Weeks, Three Hours per Week.

131—Highway Engineering.

Third Year, Second Semester, Ten Weeks, Two Hours per Week.

Text—Blanchard and Drowne—"Textbook on Highway Engineering."

141—Masonry Construction.

Fourth Year, First Semester, Fifteen Weeks, Two Hours per Week

Text—Baker:—"Masonry Construction."

142—Materials Testing.

Fourth Year, First Semester, Fifteen Weeks, Five Hours per Week.

151—Water Supply.

Fourth Year, Second Semester, Fifteen Weeks, Three Hours per Week.

Text—Turneaure and Russell:—"Public Water Supplies."

152—Hydraulic Design.

Fourth Year, Second Semester, Fifteen Weeks, Two Hours per Week.

153.—Hydraulic Engineering.

Fourth Year, Second Semester, Fifteen Weeks, Three Hour per Week.

Text—Mead:—"Water Power Engineering."

162—Sewerage and Sewage Disposal.

Fourth Year, Second Semester, Fifteen Weeks, Three Hours per Week.

Texts—Folwell:—"Sewerage."

Kinnicutt, Winslow, and Pratt:—"Sewage Disposal."

173—Sewer Design.

Fourth Year, Second Semester, Fifteen Weeks, Three Hours per Week.

174—Structures II.

Fourth Year, First Semester, Fifteen Weeks, Three Hours per Week.

Text—Spofford:—"Theory of Structures."

175—Structures III.

Fourth Year, Second Semester, Fifteen Weeks, Three Hours per Week.

Textx—Spofford:—"Theory of Structures."
Hool:—Reinforced Concrete Construction."

176—Structural Design I.

Fourth Year, First Semester, Fifteen Weeks, Nine Hours per Week.

177—Structural Design II.

Fourth Year, Second Semester, Fifteen Weeks, Nine Hours per Week.

191—Contracts.

Third Year, Second Semester, One Hour per Week.

600—Technical Writing.

Third Year, Second Semester, Fifteen Weeks, Two Hours per Week.
References.

Earle:—"Theory and Practice of Technical Writing."
Rickard—"A Guide to Technical Writing."

IV—DEPARTMENT OF MINING ENGINEERING.

400-401—Quantitative Analysis.

Third Year, First and Second Semesters, Fifteen Weeks, Nine Hours per Week.

Texts—*Mahin*:—"Quantitative Analysis."
Talbot:—"Quantitative Analysis."
Lord and Demorest:—"Metallurgical Analysis."

402—Quantitative Analysis.

Third Year, Fifteen Weeks, Two Hours per Week in First Semester, and One Hour in the Second Semester.

Text:—*Talbot and Blanchard*:—"Electrolytic Dissociation Theory."

403-404—Metallurgical Laboratory.

Fourth Year, First and Second Semester, Fifteen Weeks, Eight Hours per Week.

405—Structural Geology.

Third Year, Second Semester, Fifteen Weeks, Three Hours per Week.
Field Work, One Week in Summer School of Mining.

Text—*Pirsson*:—"Rocks and Rock Minerals."
References—*Farrell-Moses*:—"Practical Field Geology."
Hayes:—" Handbook for Field Geologists."
Spurr:—"Geology Applied to Mining."
Geikie:—"Structural Geology."

406—Mineralogy.

Third Year, Second Semester, Fifteen Weeks, Five Hours per Week.

Text—Moses and Parsons:—"Crystallography, Mineralogy, and Blow-pipe Analysis."

References.

Brush and Penfield:—"Manuel of Determinative Mineralogy and Blow-pipe Analysis."

Text—Dana:—"Text-Book of Mineralogy."

407—Economic Geology.

Fourth Year, First Semester, Fifteen Weeks, Two Hours per Week.

Text—Lindgren:—"Mineral Deposits."

References—Reports of the Geological Survey and the Mines Branch of the Canadian Department of Mines.

408—Economic Geology.

Fourth Year, Second Semester, Fifteen Weeks, Two Hours per Week.

Text—Lindgren:—"Mineral Deposits."

References.

Kempt:—"Ore Deposits of United States and Canada."

Beck:—"Nature of Ore Deposits."

Ries:—"Economic Geology."

Reports of Geological Surveys of Canada and the United States.

409—General Geology.

Third Year, Second Semester, Fifteen Weeks, Two Hours per Week.

For Students in Civil and Mining Engineering.

Text—Ries and Watson:—"Engineering Geology."

Reference—Scott:—"Introduction to Geology."

415—Mine Surveying.

Third Year, First Semester, Fifteen Weeks, Three Hours per Week.

Text—Durham:—"Mine Surveying."

420—Assaying.

Third Year, Second Semester, Fifteen Weeks, Six Hours per Week.

Text—Bugbee:—"Notes on Fire Assaying."

425—Principles of Metallurgy.

Third Year, First Semester, Fifteen Weeks, Three Hours per Week.

Text— Hofman:—"General Metallurgy."

426—Non-Ferrous Metallurgy.

Third Year, Second Semester, Fifteen Weeks, Three Hours a Week.

Texts.

Austin:—"Metallurgy of Common Metals."
McFarren:—"Textbook of Cyanide Practice."

References.

Schnabel-Louis:—"Handbook of Metallurgy."
Peters:—"Principles of Copper Smelting."
Peters:—"Modern Copper Smelting."
Julian & Smart:—"Cyaniding of Gold and Silver Ores."
Hofman:—"Metallurgy of Lead."
Collins:—"Metallurgy of Silver."
Ingalls:—"Metallurgy and Properties of Zinc".

427—Metallurgy of Iron and Steel.

Fourth Year, First Semester, Fifteen Weeks, Three Hours per Week.

Text:

Stoughton:—"Metallurgy of Iron and Steel."

References.

Campbell:—"Manufacture and Properties of Iron and Steel.
Forsythe:—"The Blast Furnace."
Harbord:—"Metallurgy of Steel."
Sauveur:—"Metallography of Iron and Steel."
Howe:—"Iron, Steel and other Alloys."

428—Metallurgy of Iron and Steel.

Fourth Year, First Semester, Lectures Two Hours a Week. Short Course for Civil, Electrical and Mechanical Engineers.

Text—Stoughton:—"Metallurgy of Iron and Steel."

429—Metallography of Iron and Steel.

Fourth Year, First Semester, One Afternoon per Week, Last Six Weeks.

Short Course for Students taking 427 *and* 428.

Text—Sauveut:— The Metallography and Heat Treatment of Iron and Steel."

450—Exploration and Shaft Sinking.

Third Year, First Semester, Fifteen Weeks, Three Hours per Week.

454—Excavation.

Third Year, Second Semester, Fifteen Weeks, Two Hours per Week.

451—Exploitation, Haulage, and Pumping.

Fourth Year, Second Semester, Fifteen Weeks, Three Hours per Week.

Texts and References.

Foster:—"Textbook of Ore and Stone Mining."
Richards:—"Mining Notes."
Ihlseng:—"Manual of Mining."
Hughes:—"Text-book on Coal Mining."

International Text-book Co:—"Coal Mining."
Boulton:—"Practical Coal Mining."
Mayer:—"Mining Methods in Europe."
Hoover:—"Principles of Mining."
Brinsmeade:—"Mining Without Timber."

452—Ventilating, Lighting, Accounting, and Valuation.

Fourth Year, Second Semester, Fifteen Weeks, Three Hours per Week.

Texts and References.

Foster:—"Textbook of Ore and Stone Mining."
Rickards:—"Mining Notes."
Ihlseng:—"Manual of Mining."
International Text-book Co:—"Coal Mining."
Coal and Metal Miners' Pocket Book.
Boulton:—"Practical Coal Mining."
Wallace:—"Simple Mine Accounting."
Rickard:—"Sampling and Estimation of Ore in a Mine."
Hoover:—"Principles of Mining."
Charlton:—"American Mine Accounting."
Finlay:—"Cost of Mining."
Herzig:—"Mine Sampling and Valuing."

453—Ore Dressing.

Third Year, Second Semester Fifteen Weeks, Three Hours per Week.

Text—Richards:—"Ore Dressing."

460—Mill Construction.

Fourth Year, First Semester, Six Weeks, Five Hours per Week.

References.

Kidder:—"Architects' and Builders' Pocket-Book."
Hobart:—"Millwrighting."
Ingalls:—"Notes on Metallurgical Mill Construction."
Ketchum:—"Design on Mill Structures."

461—Mine Plant Design.

Fourth Year, First and Second Semesters, Six Hours per Week.

465—Thesis.

Fourth Year, Second Semester, Fifteen Weeks, Eight Hours per Week.

466—Summer Course in Mining.

Third and Fourth Year, Summer Vacation, Four to Six Weeks of Observation, Sketching, etc., at Typical Mines and Plants.

600—Technical Writing.

Coal Mining Engineering.

This course is called "*The Coal Mining Engineers' Option of the Regular Course in Mining Engineering.*" It is for the benefit of those students who wish to fit themselves as mining engineers for the coal mining industry.

In the Third Year, First Semester, time is taken from chemistry of the work, and applied to the mechanical and electrical course.

In the Third Year, Second Semester, time is taken from assaying and chemistry and given to work in steam and electrical machinery.

In the Fourth Year, First Semester, time is taken from metallurgical laboratory, etc., and given over to work in electrical distribution, alternating currents, etc.

In the Fourth Year, Second Semester extra time is given to steam and gas power plants at the expense of metallurgical laboratory.

This course should enable a man to prepare himself to meet the problems arising in and around colleries in the mechanical, electrical or mining branches of engineering. The course is based upon the experience of some of the oldest of the established technical colleges in this line, and we present it with a belief that it will prepare men to become efficient colliery superintendents and managers. At the successful completion of the course a degree of Bachelor of Science is awarded to the student. The course will be given in any year when two students apply for the privileges of the same. For a tabulated statement of this option, see p.

Military Instruction.

500—Mapping, Organization, Tactics.

Third Year, First Semester, Four Weeks, One Hour per Week.

"A." Map Reading and Field Sketching.

"B." Military Administration and Organization.

Third Year, First Semester Three Weeks, One Hour per Week.

Texts.

"King's Regulations and Orders for the Canadian Militia."
"Field Service Regulations," Part II. (Organization and Administration.)
"Field Service Pocket Book."

Tactics.

Third Year, First Semester, Eight Weeks, one Hour per Week.

"A." Military History.

Text.

Official History of the selected campaign.

"B." Coast Defence Electric Lighting.

Third Year, Second Semester, Four Weeks, Two Half-Hours per Week.

Text Book.

"Military Electric Lighting," Vol. II.

"C." Field Engineering.

Third Year, Second Semester, Ten Weeks, One Hour and Two Half-hours per Week.

Texts.

"Manual of Field Engineering."
"Field Service Pocket Book."

510—Physical Training.

Third Year, First Semester, Two Half-Hours per Week.

Text Book.

"Syllabus of Physical Exercises for Schools" (Canada).

CIVIL ENGINEERING.

Engineering Camp
Three weeks field practice
THIRD YEAR

FIRST SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week		For details see		Pre-Requisites, Etc.
			Lectures and Class Room	Field Lab. or Drafting	Page	Course	
Mechanics of Engineering I...	Mechanics 1....	15	5	.....	37	101	Third Year Entrance
Advanced Surveying.....	Civil Eng. 1.....	15	1	3	39	119	Third Year Entrance
Railroad Engineering I.....	Civil Eng. 2.....	15	4	.....	39	121	Third Year Entrance
Steam Eng. Turb. & Boilers..	Thermo. 1.....	15	3	.....	33	301	Third Year Entrance
Mechanical Eng. Laboratory.	Mech. Eng. 3....	15	1	3	30	350	Concurrent with 301
Electrical Machinery.....	Elec. Eng. 1A...	15	3	.....	28	201–A	Third Year Entrance
Electrical Laboratory.....	Elec. Eng. 2.....	15	.....	3	29	250	Concurrent with 201-A
Military Science.....	Mil. Science 1...	15	1	.....	51	500	Third Year Entrance
Physical Training.....	.....	15	.....	1	52	510	.....

THIRD YEAR

SECOND SEMESTER

SUBJECTS	Referecce No.	Weeks	Hours per Week		For details see		Pre-Requisites, Etc.
			Lectures and Class Room	Field Lab. or Drafting	Page	Course	
Mechanics of Engineering II..	Mechanics 2....	1st. 9	5	.....	37	102	101
Materials Testing.....	Mechanics 3....	15	.....	3	37	103	Concurrent with 102.
Structures I.....	Civil Eng. 3.....	Last 6	5	.....	38	105	102
Advanced Surveying.....	Civil Eng. 4.....	15	2	3	39	120	119
Railroad Engineering II.....	Civil Eng. 5.....	15	3	.....	40	122	121
Highway Engineering.....	Civil Eng. 6....	10	2	.....	40	131	Third Year Entrance
Electrical Machinery.....	Elec. Eng. 4A...	15	3	.....	28	202-A	201-A
Military Science	Mil. Science 2 ..	15	2	.....	52	501	500
General Geology.....	Geology 5.....	15	3	.....	45	409	Third Year Entrance
Technical Writing.....	English 1.....	15	2	.....	42	600	Third Year Entrance

FOURTH YEAR — CIVIL ENGINEERING. — FIRST SEMESTER

Engineering Camp
Three weeks field practice.

SUBJECTS	Reference No.	Weeks	Hours per Week		For details see		Pre-Requisites. Etc.
			Lectures and Class Room	Field Lab. or Drafting	Page	Course	
Theoretical Hydraulics	Hydraulics 1	15	3	.....	38	111	101–102
Hydraulic Laboratory	Hydraulics 2	15	.....	3	38	112	Concurrent with 111
Railroad Design	Civil Eng. 7	15	.....	3	40	124	121
Masonry Construction	Civil Eng. 8	15	2	.....	40	141	102
Materials Testing	Mechanics 4	15	.....	3	40	142	Concurrent with 141
Structures II	Civil Eng. 9	15	3	.....	41	174	105
Structural Design I	Civil Eng. 10	15	.....	9	42	176	Concurrent with 174
Metallurgy of Iron and Steel	Metallurgy 3	15	2	.....	47	428	Third Year Entrance

FOURTH YEAR — SECOND SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week		For details see		Pre-Requisites, Etc.
			Lectures and Class Room	Field Lab. or Drafting	Page	Course	
Water Supply	Civil Eng. 11	15	3	.....	41	151	111–112
Hydraulic Design	Civil Eng. 12	15	.....	2	41	152	Concurrent with 151
Hydraulic Engineering	Hydraulics 3	15	3	.....	41	153	111–112
Sewerage & Sewerage Disposal	Civil Eng 13	15	3	.....	41	162	111–112
Sewer Design	Civil Eng. 14	15	.....	3	41	173	Concurrent with 162
Structures III	Civil Eng. 15	15	3	.....	42	175	174
Structural Design II	Civil Eng. 16	15	.....	9	42	177	Concurrent with 175
Contracts and Specifications	Contracts	15	1	.....	42	191	Third Year Entrance

THIRD YEAR — **MECHANICAL AND ELECTRICAL ENGINEERING.** — FIRST SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Elec. Machinery	Elec. Eng. 1	15	3	.....	28	201	Third Year Entrance.
Elec. Eng. Laboratory	Elec. Eng. 2	15	.....	3	29	250	Concurrent with 201.
Steam Eng., Turb. & Boilers	Thermo 1A	15	4	.....	30	301A	Third Year Entrance
Mech. Eng. Laboratory	Mech. Eng. 3	15	1	3	30	350	Concurrent with 301
Mechanics of Eng. 1	Mechs. 1	15	5	.....	31	101	Third Year Entrance
Military Science	Mil. Science 1	15	1	.....	51	500	Third Year Entrance
Mach. Design & Drawing	Mech. Eng. 2	15	.....	6	31	331	Third Year Entrance
Machine, Design Theory	Mech, Eng. 1	15	3	.....	30	329	Third Year Entrance
Physical Training	.....	15	.....	1	52	510	

THIRD YEAR — SECOND SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Elec. Machinery	Elec. Eng. 4	15	3	.....	28	202	201
Elec. Eng. Laboratory	Elec. Eng. 5	15	.....	3	29	251	250 and 201
Thermodynamics	Thermo. 2A	15	4	.....	30	302A	301
Mech. Eng. Laboratory	Mech. Eng. 4	15	1	3	30	351	301 and 350
Mechanics of Eng. II	Mechs. II	1st 9	5	.....	31	102	101
Materials Testing	Mechs. III	15	.....	3	31	103	Concurrent with 102
Structures 1	Civil Eng. 3	Last 6	5	.....	31	105	101 and 102
Mil. Science	Mil. Science 2	15	2	.....	52	501	500
Mach. Design and Drawing	Mech. Eng. 5	15	.....	6	31	332	329 and 331.
Machine Design Theory	Mech. Eng. 2A	15	2	.....	30	330	329
Technical Writing	English 1	15	2	.....	42	600	Third Year Entrance

FOURTH YEAR — MECHANICAL AND ELECTRICAL ENGINEERING. — FIRST SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week		For details see		Credit	Pre-Requisites, Etc.
			Lectures and Class Room	Field Lab. or Drafting	Page	Course		
Machine Design Theory...	Mech. Eng. 7 .	15	2	.....	30	330-A	2	330
Steam Power Plants.....	Mech. Eng. 8 .	15	3	.....	30	303	3	302
Theoretical Hydraulics....	Hydraulics 1...	15	3	.....	31	111	3	101–102
Hydraulic Laboratory	Hydraulics 2...	15	.....	3	32	112	1	Concurrent with III
Metallurgy of Iron & Steel	Metallurgy 7...	15	3	.....	47	428	3	Third Year Entrance
Mech. Eng. Abstracts.....	Mech. Eng. 13.	15	1	.....	34	307	1	302–330
							13	
Elec. Eng. Option								
Mach. Design Practicum..	Mech Eng. 9A	15	.....	3	31	333A	1	332
Alt. Currents & Machinery	Elec. Eng. 7...	15	3	.....	28	203	3	202
Elec. Eng. Laboratory....	Elec. Eng. 8...	15	.....	3	29	252	1	202–251
Storage Battery Eng.....	Elec. Eng. 10..	15	1	.....	29	215	2	202
							20	
Mech. Eng. Option								
Mech. Eng. Laboratory...	Mech. Eng. 6..	15	1	3	30	352	2	351
Heating and Ventilating...	Mech. Eng. 12.	15	3	.....	35	322	3	302
Machine Design Drawing..	Mech. Eng. 9..	15	.....	6	31	333	2	332
							20	

FOURTH YEAR — MECHANICAL AND ELECTRICAL ENGINEERING. — SECOND SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week		For details see		Credits	Pre-Requisites. Etc.
			Lectures and Class Room	Field Lab. or Drafting	Page	Course		
Contracts & Specifications	Contracts 1	15	1	.....	30	270	1	Third Year Entrance
Hydraulic Engineering	Hydraulics 3	15	3	.....	32	153	3	111
Electrical Distribution	Elec. Eng. 15	15	3	.....	28	209	3	203
Mach. Design & Drawing	Mech. Eng. 16.	15	3	.....	31	334	2	333 or 333A
Elec. Eng. Abstracts	Elec. Eng. 3	15	1	.....	28	208	1	.....
Elec. Engineering Option								
Elec. Railways	Elec. Eng. 16	15	2	.....	28	211	2	202–203
Elec. Eng. Laboratory	Elec. Eng. 12	15	.....	3	29	253	1	252
Alternating Currents	Elec. Eng. 11	15	3	.....	28	204	3	203
Electrical Design	Elec. Eng. 17	15	.....	3	29	212	1	203
Mechanical Eng. Option								
Steam Turbines	Mech. Eng. 10.	15	2	.....	34	305	2	302
Gas Engines	Mech. Eng. 11.	15	3	.....	34	306	3	302
Mech. Eng. Laboratory	Mech. Eng. 17.	15	1	.....	30	353	2	352
Mechanical Design	Mech. Eng. 19.	15	.....	3	36	336	1	333

THIRD YEAR — MINING ENGINEERING. — SECOND SEMESTER

Engineering Camp.
Three weeks field practice.

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Mechanics of Engineering I...	Mechanics 1....	15	5	.....	37	101	Third Year Entrance
Steam Eng. Turb. & Boilers .	Thermo 1-A.....	15	4	.....	30	301–A	Third Year Entrance
Mech. Eng. Laboratory.....	Mech. Eng. 3...	15	.....	3	30	350	Third Year Entrance
Quantitative Analysis.....	Chemistry 1....	15	1	9	43	400	Third Year Entrance
Mine Surveying.....	Mining 7.....	15	3	.....	45	415	Engineering Camp
Principles of Metallurgy.....	Metallurgy 1....	15	3	.....	45	425	Third Year Entrance
Mineralogy.....	Geology 2.....	15	2	3	44	406	Third Year Entrance
Military Science.....	Mil. Science 1...	15	1	.....	51	500	Third Year Entrance
Physical Training.....	.....	15	.....	1	52	510	Third Year Entrance

THIRD YEAR — SECOND SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Mechanics of Engineering II.	Mechanics 2....	9	5	.....	31	102	101
Structures I.....	Civil Eng. 3....	6	5	.....	31	105	101
Materials Testing.....	Mechanics 3....	15	.....	3	31	103	101
Quantitative Analysis.....	Chemistry 2....	15	1	6	43	401	400
Exploration & Shaft Sinking.	Mining 1.....	15	2	.....	47	450	Entrance
Non-Ferrous Metallurgy....	Metallurgy 2....	15	3	.....	46	426	425
Structural Geology.....	Geology 3.....	15	2	1	43	405	406
Assaying.....	Chemistry 3....	15	.....	6	45	420	400
Military Science.....	Mil. Science....	15	2	.....	52	501	500
Technical Writing.....	English 1.....	15	2	.....	49	600	Third Year Entrance

FOURTH YEAR — MINING ENGINEERING — FIRST SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Summer School in Mining		4 to 6			49	466	Third Year Work
Hydraulics	Hydraulics 1	15	3		31	111	101-102
Hydraulics Laboratory	Hydraulics 2	15		3	32	112	101-102-111
Electrical Machinery	Elec. Eng. 1-A	15	3		28	201A	Entrance
Elec. Eng. Laboratory	Elec. Eng. 2	15		3	29	250A	Entrance
Mill Construction	Mining 3	6	5		49	460	101, 102, 105
Mine Plant Design	Mining 4	15		6	49	461	With 460
Economic Geology	Geology 4	15	2		44	407	405, 406
Metallurgy of Iron and Steel	Metallurgy 3	15	3		46	427	400, 401, 425
Metallurgy Laboratory	Metallurgy 4	15		4	43	403	420
Ore Dressing	Metallurgy 5	15	3		48	453	Entrance

FOURTH YEAR — SECOND SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Clas Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Excavation	Mining 2	15	3		47	454	450
Exploitation Haulage & Pump	Mining 5	15	3		47	451	450, 302, 415
Vent., Valuation, Acct'g.	Mining 6	15	3		48	452	450, 415
Economic Geology	Geology 5	15	2		44	408	407
Contracts & Specifications	Contracts 1	15	1		30	270	
Mine Plant Design	Mining 4	15		6	49	461	460
Ore Dressing	Metallurgy 5	15	3		48	453	Third Year Entrance
Metallurgical Laboratory	Metallurgy 6	15		8	43	404	403
Thesis	Mining 8	15		8	49	465	All Preceeding Work

MINING ENGINEERING.

(Coal Mining Option)

THIRD YEAR — FIRST SEMESTER

Engineering Camp
Three weeks field practice.

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Mechanics of Engineering I...	Mechanics 1.....	15	5	.....	37	101	Third Year Entrance
Steam Eng., Turb. & Boilers:	Thermo 1.....	1st 9	3	.....	30	301A	Third Year Entrance
Applied Geology.....	Geology 1.....	15	2	.....	43	405	Third Year Entrance
Principles of Metallurgy.....	Metallurgy 1....	15	3	.....	45	425	Third Year Entrance
Mechanical Eng. Laboratory	Mech. Eng. 3...	15	.....	3	30	350	Third Year Entrance
Electrical Machinery.....	Elec. Eng. 1A...	15	2	.....	28	201A	Third Year Entrance
Electrical Laboratory.....	Elec. Eng. 2....	15	.....	3	29	250	Third Year Entrance
Exploration & Shaft Sinking.	Mining 1.....	Last 6	5	.....	47	450	Third Year Entrance
Advanced Surveying.....	Civil Eng. 1....	15	.....	9	39	120	Third Year Entrance
Military Science	Mil. Science 1 ..	15	1	.....	51	500	Third Year Entrance
Physical Training.....	.....	15	.....	1	52	510	Third Year Entrance

THIRD YEAR — SECOND SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Mechanics of Engineering II.	Mechanics 2....	15	5	.....	31	102	101
Structures I.....	Civil Eng. 3....	Last 6	5	.....	31	105	102
Steam Machinery.....	Thermo. 2.....	15	3	.....	30	302	301
Mech. Eng. Laboratory.....	Mech. Eng. 4...	15	.....	3	30	351	302
Excavation.....	Mining 2.....	Last 9	5	.....	47	454	450
Non-Ferrous Metallurgy....	Metallurgy 2....	15	3	.....	46	426	425
Quantitative Analysis.....	Chemistry 2A...	15	1	3	43	402	Special Short Course
Electrical Machinery.....	Elec. Eng. 4A...	15	2	.....	28	202A	201
Electrical Eng. Laboratory...	Elec. Eng. 5....	15	.....	3	29	251	201
Mineralogy.....	Geology 2A.....	15	.....	3	44	406	405
Mine Surveying.....	Mining 7.....	15	3	.....	45	415	Engineering Camp
Military Science	Mil. Science 2 ..	15	2	.....	52	501	500
Technical Writing.....	English.....	15	2	.....	49	600	Third Year Entrance

FOURTH YEAR
Summer Mining School
Four to Six weeks

MINING ENGINEERING

(Coal Mining Option.)

FIRST SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Mill Construction	Min. Eng. 3	6-0	5	.....	49	460	101, 102, 105
Mine Plant Design	Min. Eng. 4	15	.....	6	49	461	With 460
Metallurgy of Iron & Steel	Metallurgy 3	15	3	.....	46	427	402
Metallurgical Laboratory	Metallurgy 4A	15	.....	3	43	403A	Short Crs. on Coals
Steam Power Plants	Mech. Eng. 8	15	3	.....	30	303	301, 302
Testing Materials	Mechanics 3	15	.....	3	31	103	101, 102, 105
Economic Geology	Geology 4	15	2	.....	44	407	405, 406.
Theoretical Hydraulics	Hydraulics 1	9-0	3	.....	31	111	111
Hydraulic Laboratory	Hydraulics 2	9-0	.....	2	32	112	101

FOURTH YEAR

SECOND SEMESTER

SUBJECTS	Reference No.	Weeks	Hours per Week: Lectures and Class Room	Hours per Week: Field Lab. or Drafting	For details see: Page	For details see: Course	Pre-Requisites, Etc.
Vent. Valuation Acct'g	Min. Eng. 6	15	3	.....	48	452	.....
Mine Plant Design	Min. Eng. 4	15	.....	6	49	461	460
Exploration, Haulage Pump.	Min. Eng. 5	15	3	.....	47	451	.....
Metallurgical Laboratory	Metallurgy 6A	15	.....	6	43	404	403A, short course on Coals.
Steam Turbines	Mech. Eng.	15	2	.....	34	305	301, 302
Gas Engines	Mech. Eng.	15	3	.....	34	306	301, 302
Electric Distribution	Elec. Eng.	15	3	.....	28	209	201. 202
Thesis	Min. Eng. 8	15	.....	6	49	465	All Preceding work.
Contracts and Specifications.	Contracts	15	1	.....	30	270	.....

GRADUATES OF THE NOVA SCOTIA TECHNICAL COLLEGE.

1910.

Name	Home Address	Degree
F. R. Archibald	Halifax, N. S.	Civil Engineering.
F. M. Dawson	Truro, N. S.	Civil Engineering.
C. L. Dimock	Upper Newport, N. S.	Civil Engineering.
T. W. Hardy, Jr.	Halifax, N. S.	Mining Engineering.
E. S. Kent	Truro, N. S.	Civil Engineering
A. G. McAulay	Glace Bay, N. S.	Civil Engineering.
**N. W. McKay	Balmoral Mills	Mining Engineering.
Walter Putnam	Maitland, N. S.	Civil Engineering.
E. L. Thorne, Jr.	Dartmouth, N. S.	Civil Engineering.

**Not granted full diploma.

1911.

Name	Home Address	Degree
H. F. Bober	Windsor, N. S.	Electrical Engineering.
J. L. Cavanagh	New Glasgow, N. S.	Mining Engineering
K. G. Chisholm	Halifax, N. S.	Civil Engineering.
D. M. Collingwood	Upper Parkstone, Eng.	Mining Engineering.
T. M. DeBlois	Halifax, N. S.	Electrical Engineering.
C. K. Hood	Yarmouth, N. S.	Electrical Engineering.
J. F. Lumsden	Gabarus, C. B.	Electrical Engineering.
R. W. McColough	Waverly, N. S.	Civil Engineering.
C. H. MacDonald	Sydney, C. B.	Civil Engineering.
J. A. MacKay	Balmoral Mills, N. S.	Civil Engineering.
L. A. Mylius	Halifax, N. S.	Mining Engineering.
Gordon S. Stairs	Halifax, N. S.	Civil Engineering.

1912.

Name	Home Address	Degree
*G. V. Boone	St. Johns', Nfld	Electrical Engineering.
D. R. McKean	West La Have, N. S.	Civil Engineering.
C. E. McKenzie	Springhill, N. S.	Mining Engineering.
Ranald McKinnon	New Aberdeen, N. S.	Civil Engineering.
J. W. Morrison	Oldham. N, S,	Mining Engineering.
C. B. North	Hantsport, N. S.	Mining Engineering.
G. F. Simpson	Halifax, N. S.	Electrical Engineering.

*Killed in action in France.

GRADUATES OF THE NOVA SCOTIA TECHNICAL COLLEGE.

1913.

Name	Home Address	Degree
R. B. Carson	Dartmouth, N. S.	Electrical Engineering.
O. S. Cox	Upper Stewiacke, N. S.	Civil Engineering.
C. S. Creighton	Dartmouth, N. S.	Civil Engineering.
H. W. L. Doane	Halifax, N. S.	Civil Engineering.
J. D. Irving	New Glasgow, N. S.	Mechanical Engineering
L. B. McCurdy	Truro, N. S.	Civil Engineering
H. S. McKean	North Sydney, N. S.	Electrical Engineering
I. P. McNab	Upper Malagash, N. S.	Mechanical Engineering
W. H. Noonan	Pictou, N. S.	Civil Engineering.
J. P. Norrie	Truro, N. S.	Mining Engineering.
M. H. O'Brien	Springhill, N. S.	Mining Engineering.
F. H. Palmer	Halifax, N. S.	Civil Engineering.

1914.

Name	Home Address	Degree
E. W. G. Chapman.....	Halifax, N. S.....	Civil Engineering.
R. P. Donkin.....	Halifax, N. S.....	Mechanical Engineering
C. A. DeWitt Fowler....	Halifax, N. S.....	Civil Engineering.
S. W. Gray.....	Westville, N. S.....	Civil Engineering.
H. W. Mahon	Great Village, N. S.	Civil Engineering.
J. P. Messervey.....	Halifax, N. S.....	Mining Engineering.
D. R. Munro.....	Amherst, N. S.....	Electrical Engineering.
R. Murray.....	Springhill, N. S.....	Electrical Engineering.
T. J. MacKavanagh....	Shawinigan Falls, P. Q....	Electrical Engineering.
R. B. Roach.....	Windsor, N. S.....	Electrical Engineering
K. E. Whitman.....	Petite Riviere, N. S.....	Civil Engineering.

1915.

Name	Home Address	Course
Robert Porter Freeman	Halifax, N. S.....	Civil Engineering.
Rupert Melvin Kinnie...	Berwick, N. S.....	Civil Engineering.
Angus Ernest McPhie ..	West Bay, C. B.....	Civil Engineering.
James Welton Spence...	St. Croix, N. S.....	Civil Engineering.
C. H. P. Williston.....	Halifax, N. S.....	Civil Engineering.
William E. Jefferson....	Lawrencetown, N. S.....	Electrical Engineering.
Olin Edman Prestwood..	Sydney Mines, N. S.....	Electrical Engineering & Mechanical Engineering
Donald Rice Munro....	Amherst, N. S.....	Mechanical Engineering
Waldo Perley Crowe....	Wolfville, N. S.....	Mining Engineering.

1916.

Name	Home Address	Course
J. R. H. Chipman.....	Kentville, N. S.....	Civil Engineering.
James B. Hayes.....	Halifax, N. S.....	Civil Engineering.
Rowland C. Moore.....	Halifax, N. S.....	Civil Engineering.
Richard L. Nixon.....	Kentville, N. S.....	Civil Engineering.
John J. Sears.....	Antigonish, N. S.....	Civil Engineering.
Leslie C. Strickland	Trenton, N. S.....	Civil Engineering.
William H. Chisholm...	Halifax, N. S.....	Mechanical Engineering
Clarke O. Noble	New York, U. S. A.....	Mining Engineering.

SHORT COURSES.

RECIPIENTS OF DIPLOMAS.

1911.

Name	Home Address	Course
W. H. Hooke.....	Halifax, N. S.....	Land Surveying.
R. A. Logan.....	Middle Musquodoboit, N. S.	Land Surveying.
R. J. Macdonald.....	Halifax, N. S.....	Land Surveying.
R. J. Milgate.....	Middleton, N. S.....	Land Surveying.
P. G. Morrow	Halifax, N. S.....	Land Surveying.

1912.

Name	Home Address	Course
Lindsay K. Patterson...	Aylesford, N. S.....	Land Surveying.
Chas. F. Whitman.....	Halifax, N. S.	Land Surveying.
A. M. Foster.....	Bridgetown, N. S.....	Land Surveying.
Raymond Chisholm.....	Harbor Bouche, N. S.....	Land Surveying.
Daniel A. Gasper.....	Truro, N. S.....	Land Surveying.
J. O. Hunton.....	Sackville, N. B.....	Land Surveying.

1913.

Name	Home Address	Course
*William L. Brine.....	French Village, N. S.....	Land Surveying.
Vincent, R. E. Harrison.	Southampton, N. S.	Land Surveying.
Freeman Tupper.....	Milton, N. S.....	Land Surveying.
Harry E. McDonald....	D'Escouse, C. B.....	Land Surveying.

*Deceased.

1914.

Name	Home Address	Course
G. W. G. Allen	Halifax, N. S.....	Land Surveying.
Peter Baxendale.....	Sydney Mines, N. S.....	Land Surveying.
Thomas H. Benthan....	Sydney Mines, N. S.....	Land Surveying.
Frank P. Brennan.....	Halifax, N. S.....	Land Surveying.
James A. Donovan.....	Halifax, N. S.....	Land Surveying.
Reginald Dickie.....	Brookfield, N. S.....	Land Surveying.
Edwin Dorey.....	Dartmouth, N. S.....	Land Surveying.
Bertram Padmore.....	England.....	Land Surveying.
G. A. Robertson.....	Barrington Passage.....	Land Surveying.
F. H. Zwicker	Lunenburg, N. S.	Land Surveying.
Arnold R. Millburn...	Sydney Mines, N. S....	Metallurgy of Steel

1915.

Name	Home Address	Course
Enna Elm Dauphinee	Hubbards	Land Surveying.
Robert Keyes DeLong	Shannon, N. B.	Land Surveying.
Frank Andrew Grant	Halifax	Land Surveying
Bert Grantmeyer	Sydney	Land Surveying.
James Frederick Kelley	Stellarton	Land Surveying.
Henry Harris Miller	Halifax	Land Surveying.
Donald McAskill	Stellarton	Land Surveying.
John Angus McLellan	Bellecote, C. B.	Land Surveying.
Stanley Robert Prest	Bedford	Land Surveying.
Arthur Hugh Thomson	Halifax	Land Surveying.
Robert Stark Winton	Stellarton	Land Surveying.
Edward G. Maxwell	Halifax	Electrical Machinery.
Clarence M. McKay	New Glasgow	Struc. Steel Drafting.
Frederick J. Cumming	Halifax	Steam Engineering.
William R. Dand	New Glasgow	Steam Engineering.
Thomas D. Martin	Halifax	Steam Engineering.
Charles C. Byrnes	Baddeck	Architectural Drafting.
Robert Morton, Jr.	Halifax	Architectural Drafting.

1916.

Peter G. Boutilier	French Village	Land Surveying.
Stephen M. Fulton	Sydney	Land Surveying.
John C. Walker	Halifax	Land Surveying.
Harold Short	Halifax	Electrical Machinery.
Ed. T. MacA. Morgan	Smith's Cove	Electrical Machinery.
Gordon M. Totten	Sydney	Electrical Machinery.
James W. Douglas	Glengarry	Architectural Drawing.
William H. Gunn	East River, St. Mary's	Architectural Drawing.
Charles C. Byrnes	Baddeck	Architectural Drawing 2nd year.

1916.

REGULAR STUDENTS REGISTERED 1915-1916.

Name	Home Address	Where Previously Educated
Kenneth L. Dawson	York, P. E. I.	Mt. Allison.
James B. Hayes	Halifax	Mt. Allison and Dalhousie.
Jack R. H. Chipman	Kentville	Acadia.
D. A. Y. Colquhoun	Halifax	Dalhousie.
Leslie C. Strickland	Trenton	Dalhousie.
Rowland C. Moore	Halifax	Dalhousie.
Aubrey H. Whitman	Lawrencetown	Acadia.
Stephen L. Fultz	Halifax	Dalhousie.
Samuel K. Payzant	Falmouth	Acadia.
John J. Sears	Antigonish	St. Francis Xavier.
Richard L. Nixon	Kentville	King's College.
John H. MacDonald	Sydney Mines	Dalhousie.
William H. Chisholm	Halifax	Dalhousie.
Clarke O. Noble	Brooklyn, N. Y.	Dalhousie.

SPECIAL STUDENTS 1915-1916.

Norman S. B. Watson	Charlottetown, P. E. I.
William G. MacDonald	Halifax.
Thomas L. Salterio	Halifax.
William P. McNeil	Halifax.